

# UTILITY PATENT APPLICATION TRANSMITTAL (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.  
MICT-0039-D2

Total Pages in this Submission

**TO THE ASSISTANT COMMISSIONER FOR PATENTS**Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

and invented by:

DAVID J. CORISIS, WALTER L. MODEN AND TERRY R. LEE

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:
☐ Continuation    ☒ Divisional    ☐ Continuation-in-part (CIP) of prior application No.: 08/978,397

Which is a:

☐ Continuation    ☐ Divisional    ☐ Continuation-in-part (CIP) of prior application No.:

Which is a:

☐ Continuation    ☐ Divisional    ☐ Continuation-in-part (CIP) of prior application No.:

Enclosed are:

**Application Elements**

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 18 pages and including the following:
  - a. ☒ Descriptive Title of the Invention
  - b. ☐ Cross References to Related Applications (if applicable)
  - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
  - d. ☐ Reference to Microfiche Appendix (if applicable)
  - e. ☒ Background of the Invention
  - f. ☒ Brief Summary of the Invention
  - g. ☒ Brief Description of the Drawings (if drawings filed)
  - h. ☒ Detailed Description
  - i. ☒ Claim(s) as Classified Below
  - j. ☒ Abstract of the Disclosure

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## Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)

a. ☒ Formal Number of Sheets 2

b. ☐ Informal Number of Sheets \_\_\_\_\_

4. ☒ Oath or Declaration

a. ☐ Newly executed (original or copy) ☐ Unexecuted

b. ☒ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)

c. ☒ With Power of Attorney ☐ Without Power of Attorney

d. ☐ DELETION OF INVENTOR(S)

Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference (usable if Box 4b is checked)

The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Computer Program in Microfiche (Appendix)

7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)

a. ☐ Paper Copy

b. ☐ Computer Readable Copy (identical to computer copy)

c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

## Accompanying Application Parts

8. ☐ Assignment Papers (cover sheet & document(s))

9. ☐ 37 CFR 3.73(B) Statement (when there is an assignee)

10. ☐ English Translation Document (if applicable)

11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations

12. ☒ Preliminary Amendment

13. ☒ Acknowledgment postcard

14. ☒ Certificate of Mailing

☐ First Class ☒ Express Mail (Specify Label No.): EL155807046US

**UTILITY PATENT APPLICATION TRANSMITTAL**  
**(Large Entity)**

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**Accompanying Application Parts (Continued)**

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. ☐ Additional Enclosures (please identify below):

The prior application is assigned of record to Micron Technology, Inc.

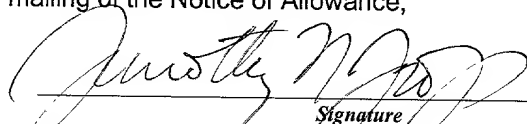
**Fee Calculation and Transmittal**

**CLAIMS AS FILED**

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	13	- 20 =	0	x \$22.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$82.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$790.00
OTHER FEE (specify purpose)					\$0.00
TOTAL FILING FEE					\$790.00

- ☒ A check in the amount of \$790.00 to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 20-1504 as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: September 14, 1998

  
Signature

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CC:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant: David J. Corisis, et al.  
Filed: Concurrently herewith.  
Title: INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

Assistant Commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Please amend the above-referenced application.

In the Specification:

Please insert at the first line --This is a divisional of prior Application No. 08/978,397 filed November 25, 1997--.


In the Claims:

Please cancel claims 1-32 and 46-67 before calculating the filing fee.

The Assistant Commissioner is authorized to pay any additional fees or credit any overpayment to Deposit Account No. 20-1504 (MICT-0039-D2).

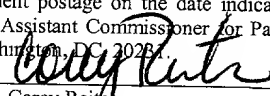
Respectfully submitted,

Date: 9/12/98

  
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MICT-0039-D2

Date of Deposit: 9/14/98  
I hereby certify under 37 CFR 1.8(a) that this correspondence is being deposited with the United States Postal Service as **Express Mail** with sufficient postage on the date indicated above and is addressed to the Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

  
Corey Reiter

ATTORNEY DOCKET NO: 07653/015001 (97-553)

APPLICATION  
FOR  
UNITED STATES LETTERS PATENT

TITLE: INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

APPLICANT: DAVID J. CORISIS  
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"EXPRESS MAIL" Mailing Label Number EH54238067205

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I hereby certify under 37 CFR 1.10 that this correspondence is being deposited with the United States Postal Service as "Express Mail Post Office To Addressee" with sufficient postage on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Adam Holmes  
Adam Hol

INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

Background of the Invention

5 This invention relates generally to packages with a tall aspect ratio, such as vertical surface mount packages ("VSMP"), for integrated circuits and particularly, to techniques for supporting those structures.

10 In a variety of computer applications it is desired to reduce bus lengths to enable higher operating frequencies. For example, a number of memory and other devices may be connected to a bus in a computer system. The more space the devices take, generally the longer the bus length. The longer bus length normally adds resistance and capacitance which may be adverse to achieving higher bus  
15 operating frequencies. By mounting the devices on edge, the devices may be packed more closely, reducing bus lengths and making possible higher bus operating frequencies.

20 Because VSMP technology involves positioning the packages in an on-edge vertical alignment, the devices have considerable moment arms about their points of connection to the printed circuit board ("PCB") or card. The VSMP is generally supported on a pair of L-shaped leads and may have no other connection to the PCB or card.

25 Although the VSMP package improves signal integrity at high frequencies by minimizing the bus length, the VSMP packages may be prone to a variety of stress and vibration induced failures because of their on-edge orientation. Thus, it would be desirable to have a way to provide tall  
30 aspect ratio packages which are more resistant to mechanical failures.

### Summary of the Invention

In accordance with one aspect of the present invention, a support for an integrated circuit package extending upwardly from a surface includes a first portion arranged to engage the package at a point spaced above the location where the package is connected to the surface. A second portion, connected to the first portion, is adapted to prevent movement of the package relative to the surface.

In accordance with another aspect of the present invention, an integrated circuit device, electrically connectable to a surface, includes an electrical connection from the surface to the device. A first portion is arranged to engage the device at a point spaced above the connection. A second portion is connected to the first portion and is adapted to prevent movement of the device relative to the surface.

In accordance with still another aspect of the present invention, an electronic device includes a plurality of integrated circuit packages. A surface is electrically connected to each of the plurality of packages. A support is arranged to engage each of the packages at a point spaced above the surface to prevent movement of the packages relative to the surface.

In accordance with yet another aspect of the present invention, a method for preventing relative movement between a surface and an integrated circuit package connected to the surface includes the step of engaging the package at a point spaced away from the location where the package is connected to the surface. The package is braced to the surface to prevent movement of the package relative to the surface at the point of engagement of the package.

In accordance with yet another aspect of the present invention, a device for preventing relative movement between

a plurality of vertical surface mount packages and a surface includes a first portion arranged to engage a pair of packages at a point spaced away from the location of the connection between the packages and the surface. A second  
5 portion is connected to the first portion and to the surface.

In accordance with but another aspect of the present invention, a method for stabilizing vertical surface mount packages mounted on a surface includes the step of inserting  
10 a member between two adjacent packages. The packages are braced against movement relative to the surface.

In accordance with another aspect of the present invention, a computer system includes a printed circuit board and an integrated circuit connected to and extending  
15 away from the board. A device is arranged to engage the integrated circuit at a point spaced from the connection to the board to prevent relative movement between the board and the integrated circuit.

In accordance with but another aspect of the present invention, a method for preventing relative movement between  
20 a surface and an integrated circuit package connected to the surface includes the step of engaging the package at a point spaced away from the location where the package is connected to the surface. The integrated package is braced to the  
25 surface to prevent movement of the package relative to the surface at the point of engagement of the package.

In accordance with another aspect of the present invention, a method for stabilizing a vertical surface mount package secured to a surface includes the step of sliding an  
30 engaging framework over the package. The framework is secured to a structure other than the package.

In accordance with still another aspect of the present invention, a method for stabilizing integrated



circuit packages secured to a surface involves arranging a support about the package. The support is expanded into engagement with the package.

In accordance with another aspect of the present invention, a support for an integrated package is connectable to a surface. A member is adapted to be positioned about said package. The member is expandable in response to heat into engagement with the package. A connection is made between the member and the surface.

The details of one or more embodiments of the inventions are set forth in the accompanying drawing and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

#### Brief Description of the Drawing

Fig. 1 is a cross-sectional view taken generally along the line 1-1 in Fig. 2;

Fig. 2 is a top plan view of the embodiment shown in Fig. 1;

Fig. 3 is a vertical cross-sectional view through a second embodiment of the present invention;

Fig. 4 is a top plan view of the embodiment shown in Fig. 3;

Fig. 5 is a vertical cross-sectional view through another embodiment of the present invention;

Fig. 6 is a top plan view of the embodiment shown in Fig. 5;

Fig. 7 is a top plan view of another embodiment of the present invention;

Fig. 8 is a vertical cross-sectional view through another embodiment of the present invention; and

Fig. 9 is a schematic depiction of a computer system in accordance with one aspect of the present invention.

#### Description of the Preferred Embodiments

Referring to the drawing wherein like reference characters are utilized for like parts throughout the several views, a PCB or card 10 includes an upper surface 11 which secures a plurality of the VSMPs 12 or other packages on the surface 11 by way of a support 14. Each package 12 extends vertically from a pair of opposed, L-shaped contacts 16. While the present invention is described with respect to an illustrated embodiment involving VSMPs, the present invention may be applied for any package having a substantial height or a tall aspect ratio.

The support 14 includes a pair of parallel rails 18, shown in Fig. 2, which engage the opposed side edges 20 of each package 12. Each rail 18 includes a post 22, shown in Fig. 1, which may pluggingly engage the PCB or card 10. For example, each of the packages 12 may include a notched portion 24 which is engaged by a bump or tab 26 connected to each of the rails 18.

In this way, each of the packages 12 is supported from below on the contacts 16 and also at a point spaced above the point of connection to the PCB or card 10 by the rails 18 which in turn are connected to the posts 22. This stabilizes the vertically mounted packages 12 against vibration and excessive bending forces around their point of connection to the PCB or card 10.

Referring to Figs. 3 and 4, a support 14a includes a pair of spaced lugs 28 (shown in Fig. 4) and a transverse cross piece 30 which engages the top edges of the packages 12. The support lugs 28 provide a wide base for connection to the cross piece 30 to stabilize the connection between

the cross piece 30 and the tops of the packages 12. The lugs 28 may plug into the board 10.

The undersurface 31 of the cross piece 30 has a combed configuration with a plurality of teeth 32 which extend downwardly and engage each package 12 snugly on two sides. The entire support 14a may be molded of plastic material. Alternatively, the teeth 32 could be formed of foam material attached to a plastic molded cross piece 30.

Again, the connection between the package 12 and teeth 32 results in diminished relative vibration forces on the packages 12 and stabilization against bending forces acting about the contacts 16. Thus, if the packages 12 are securely retained at a point spaced from their points of connection 16 to the PCB or card 10, mechanical failures should be reduced.

Turning now to Figs. 5 and 6, a support 14b may be entirely or partly formed of a plastic foam material. Advantageously, the foam is an antistatic foam such as a high density polystyrene foam. As shown in Fig. 6, the foam may be in the form of a block having a plurality of slits 34 formed therein. Each slit 34 preferably has a cross-sectional size corresponding to that of the packages 12. As a result, when the support 14b is slid over and down on the packages 12, they telescope through the foam support 14b.

Thus, the packages 12 are snugly engaged by the resiliency of the foam against their sides 36. The height of the foam support 14b is subject to considerable variation but, as illustrated, the foam may extend a substantial portion of the height of the packages 12. In this way, the packages 12 are stabilized at a point spaced from their point of connection 16 to the PCB card 10.

Advantageously the lower surface 38 of the foam is covered with an adhesive material to adhesively secure the

foam support 14b to the upper surface 11 of the board or card 10. In addition, if desired, transversely extending slots 40 may be formed in the support 14b which allow air circulation from the exterior to the underside section of each package 12 and particularly to the opening 42 under each package.

In addition, the support 14c may be made in whole or in part of a heat expandable material. Suitable expandable plastics include thermoplastic elastomers including ethylene-propylene copolymers, polyethylene, ethylene copolymers, ionomers, polyvinyl chloride polymers, and styrene butadiene block polymers. These polymers may be combined with a blowing or foaming agent so that when the support 14c is subjected to a predetermined temperature it expands volumetrically. In this way, the support 14c can be positioned about a package 12, as shown in Fig. 7, with the slots 34 having a larger cross-sectional area than the packages 12. The support 14 volumetrically expands to resiliently engage package 12, as illustrated in Fig. 6.

It is also advantageous if the foam or other conformal material is heat conductive to spread the heat and reduce package temperature. The foam or other conformal material could be antistatic foam or a material with heat conducting fibers or particles such as metal fibers dispersed through the material.

The support 14 may also be spaced from the board 10, as shown in Fig. 8. While a foam or conformal support 14b is shown in Fig. 8, other rigid supports, such as the support 14a without the vertical portions, shown in Fig. 3, may be used. By blocking the devices 12 against one another in this fashion, the stresses on the devices 12 may be reduced.

Referring to Fig. 9, an exemplary computer system

in accordance with the present invention is illustrated. As illustrated, the system 50 includes a microprocessor 52 and a system bus 54. The system bus 54 connects to a memory controller 56 which in turn connects to a plurality of memory devices 58 which may be implemented as packages 12. The microprocessor 52 also connects to a bridge 60 which in turn connects to at least one additional bus, such as a peripheral component interconnect or PCI bus 62. A plurality of input-output devices 64, such as a keyboard, monitor, hard disk drive, modem or the like may be connected to the bus 62.

While the present invention has been described with respect to a limited number of embodiments, those skilled in the art will appreciate numerous modifications and variations and it is intended that all variations and modifications as fall within the true spirit and scope of the present invention should be covered by the appended claims.

What is claimed is:

1           1.    A support for an integrated circuit package  
2    extending upwardly from a surface, said support comprising:  
3               a first portion arranged to engage said package  
4    at a point spaced above the location where said package is  
5    electrically connected to said surface; and  
6               a second portion connected to said first  
7    portion and adapted to prevent movement of said package  
8    relative to said surface.

1           2.    The support of claim 1, wherein said package is  
2    engaged by said first portion on the upper end of said  
3    package.

1           3.    The support of claim 1, wherein said first  
2    portion includes a pair of surfaces which engage said  
3    package on two opposed surfaces of said package, sandwiching  
4    said package between said first portion.

1           4.    The support of claim 3, wherein said support is  
2    resiliently biased against the sides of said package.

1           5.    The support of claim 3, wherein said support  
2    contacts the side edges of said package.

1           6.    The support of claim 1, wherein said second  
2    portion is directly connected to said surface.

1           7..   The support of claim 1, wherein support is made  
2    at least in part of a conformal material.

1           8.    The support of claim 1, wherein said support is  
2    made at least in part of plastic foam.

1           9.    The support of claim 8, wherein said support is  
2   made of plastic foam with at least one slot formed therein,  
3   said slot sized to resiliently engage said package.

1           10.   The support of claim 9, wherein said foam  
2   includes adhesive on its bottom to secure said foam to said  
3   surface.

1           11.   The support of claim 9, wherein said foam is  
2   heat expandable.

1           12.   An integrated circuit package electrically  
2   connectable to a surface comprising:  
3               a first portion arranged to engage said package  
4   at a point spaced above said electrical connection to said  
5   surface; and  
6               a second portion connected to said first  
7   portion, said second portion adapted to prevent movement of  
8   said package relative to said surface.

1           13.   The package of claim 12, wherein said package  
2   is contacted on its upper end.

1           14.   The package of claim 12, wherein said first  
2   portion includes a pair of surfaces which engage said  
3   package on two opposed surfaces of said package, sandwiching  
4   said package between said first portion.

1           15.   The package of claim 14, wherein said first  
2   portion is resiliently biased against the sides of said  
3   package.

1           16. The package of claim 14, wherein said first  
2     portion contacts the side edges of said package.

1           17. The package of claim 12, wherein said second  
2     portion is directly connected to said surface.

1           18. The package of claim 14, wherein said first and  
2     second portions are made at least in part of plastic foam.

1           19. The package of claim 18, wherein said portions  
2     are made of plastic foam with at least one slot formed  
3     therein, said slot sized to resiliently engage said package.

1           20. The package of claim 19, wherein said foam  
2     includes adhesive on its bottom to secure said foam to said  
3     surface.

1           21. The package of claim 14, wherein said first and  
2     second portions are made at least in part of conformal  
3     material.

1           22. A device for preventing relative movement  
2     between a pair of integrated circuit packages with a tall  
3     vertical profile and a surface, said device comprising:  
4                 a first portion arranged to engage said pair of  
5     said packages at a point spaced away from the location of  
6     the connection between said packages to said surface; and  
7                 a second portion connected to said first  
8     portion and to said surface.

1           23. The device of claim 22, wherein said packages  
2     are contacted on their upper ends.



1           24. The device of claim 22, wherein said first  
2 portion includes a pair of surfaces which engage said  
3 packages on two opposed surfaces of said packages,  
4 sandwiching each of said packages between said first  
5 portion.

1           25. The device of claim 24, wherein said first  
2 portion is resiliently biased against the sides of said  
3 packages.

1           26. The device of claim 24, wherein said first  
2 portion contacts the side edges of said packages.

1           27. The device of claim 22, wherein said second  
2 portion is directly connected to said surface.

1           28. The device of claim 24, wherein said portions  
2 are made at least in part of conformal material.

1           29. The device of claim 24, wherein said portions  
2 are made at least in part of plastic foam.

1           30. The device of claim 29, wherein said portions  
2 are made of plastic foam with at least one slot formed  
3 therein, said slot sized to resiliently engage said  
4 packages.

1           31. The device of claim 30, wherein said foam  
2 includes adhesive on its bottom to secure said foam to said  
3 surface.

1           32. The device of claim 30, wherein said foam is  
2 heat expanded.

33. An electronic device, comprising:  
a plurality of integrated circuit packages; and  
a surface electrically connected to each of  
said packages; and  
a support arranged to engage each of said  
packages at a point spaced above said surface to prevent  
movement of said packages relative to said surface.

34. The device of claim 33, wherein each of said packages is contacted on its upper end.

35. The device of claim 33, wherein said first portion includes a pair of surfaces which engage each of said packages on two opposed surfaces, sandwiching said packages.

36. The device of claim 35, wherein said support is resiliently biased against the sides of said packages.

37. The device of claim 36, wherein said support contacts the side edges of said packages.

38. The device of claim 33, wherein said support is made of a heat conducting material.

39. The device of claim 38, wherein said material is a conformal material.

40. The device of claim 38, wherein said material is a foam having heat conductive particles dispersed through it to increase its heat conductivity.

1           41. The device of claim 37, wherein said support  
2 includes outwardly extending tabs arranged to engage  
3 depressions in said packages.

1           42. The device of claim 33, wherein said support is  
2 directly connected to said surface.

1           43. The device of claim 35, wherein said support is  
2 made at least in part of plastic foam.

1           44. The device of claim 43, wherein said support is  
2 made of plastic foam with a plurality of one slots formed  
3 therein, each slot sized to resiliently engage one of said  
4 modules.

1           45. The device of claim 44, wherein said foam  
2 includes adhesive on its bottom to secure said foam to said  
3 surface.

1           46. A computer system, comprising:  
2           a printed circuit board;  
3           an integrated circuit device connected to and  
4 extending away from said board; and  
5           a device arranged to engage said device at a  
6 point spaced from said connection to said board to prevent  
7 relative movement between said board and said device.

1           47. A method for preventing relative movement  
2 between a surface and an integrated circuit package  
3 connected to said surface, comprising:  
4           engaging said package at a point spaced away  
5 from the location where said package is connected to said  
6 surface; and

7           bracing said package to said surface to prevent  
8 movement of said module relative to the surface at the point  
9 of engagement of said package.

1           48. The method of claim 47, including the step of  
2 engaging a plurality of packages, said packages having  
3 opposed side surfaces and an upper edge, side edges, and a  
4 bottom edge, said bottom edge connected to said surface,  
5 said method including the step of engaging the side surfaces  
6 of said packages.

1           49. The method of claim 47, including the step of  
2 engaging the top edges of said packages.

1           50. The method of claim 48, including the step of  
2 resiliently engaging said packages.

1           51. The method of claim 47, including the step of  
2 simultaneously engaging a plurality of adjacently positioned  
3 packages and bracing said packages against said surface and  
4 against each other.

1           52. The method of claim 47, including the step of  
2 telescopically sliding a foam portion over said package into  
3 engagement with said surface.

1           53. A method for stabilizing integrated circuit  
2 packages mounted on a surface, comprising:  
3           inserting a member between two adjacent  
4 packages; and  
5           bracing said packages against movement relative  
6 to said surface.

1           54. The method of claim 53, including the step of  
2 bracing said packages against one another.

1           55. The method of claim 54, including the step of  
2 bracing said packages directly against said surface.

1           56. The method of claim 53, including the step of  
2 sliding a foam portion downwardly between two adjacent  
3 packages and resiliently biasing said foam against said  
4 packages.

1           57. The method of claim 53, wherein said member  
2 does not contact said surface.

1           58. A method for stabilizing integrated circuit  
2 packages secured to a surface, comprising:  
3           sliding an engaging framework over said  
4 packages; and  
5           securing said framework to a structure other  
6 than said packages.

1           59. The method of claim 58, including the step of  
2 also securing said framework to said packages.

1           60. The method of claim 58, including the step of  
2 resiliently engaging said packages.

1           61. The method of claim 58, including the step of  
2 clamping said packages to said surface.

1           62. A method for stabilizing integrated circuit  
2 packages secured to a surface, comprising:  
3                 arranging a support about a package; and  
4                 causing said support to expand into engagement  
5 with said package.

1           63. The method of claim 62, including heat  
2 expanding said support.

1           64. The method of claim 62, including securing said  
2 support to said surface.

1           65. A support for an integrated package connectable  
2 to a surface, comprising:  
3                 a member adapted to be positioned about said  
4 package, said member being expandable in response to heat  
5 into engagement with said package; and  
6                 a connection between said member and said  
7 surface.

1           66. The support of claim 65, wherein said member is  
2 made of foam, said member having an opening to receive said  
3 package.

1           67. The support of claim 65, wherein said member  
2 includes a plurality of openings to receive a plurality of  
3 packages.

## INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

### Abstract of the Disclosure

A system for supporting integrated circuit packages to prevent mechanical failure of the packages at their connection to a printed circuit board or card involves  
5 bracing the packages to the board or card, The packages may also be braced against one another. The structure is particularly well adapted to supporting vertical surface mount packages at a point spaced from the point where they connect to a printed circuit board or card.

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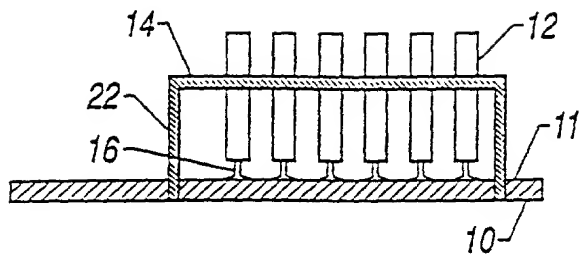


FIG. 1

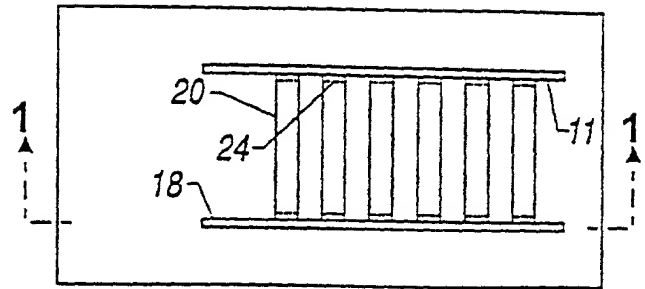


FIG. 2

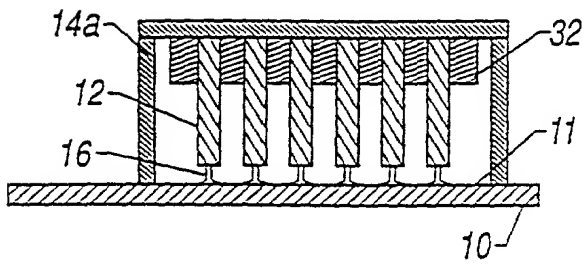


FIG. 3

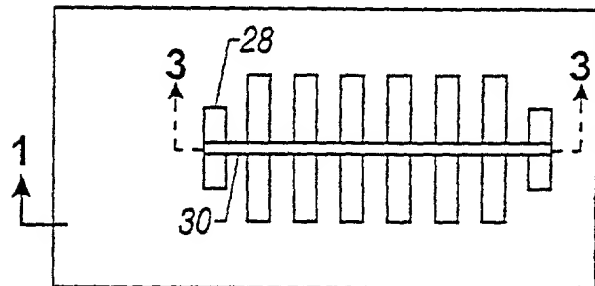


FIG. 4

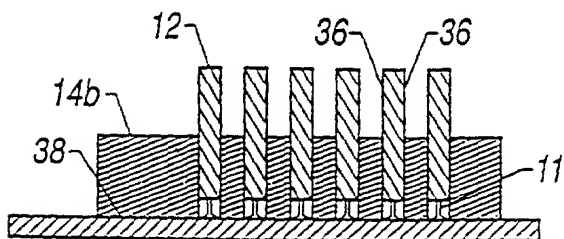


FIG. 5

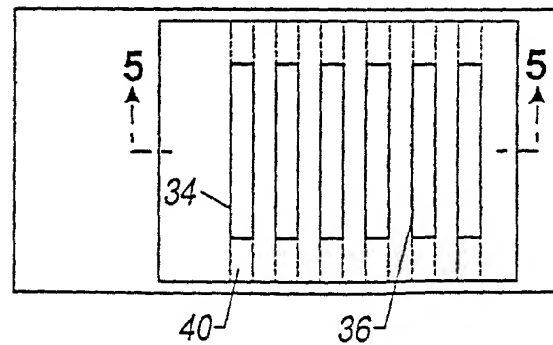


FIG. 6



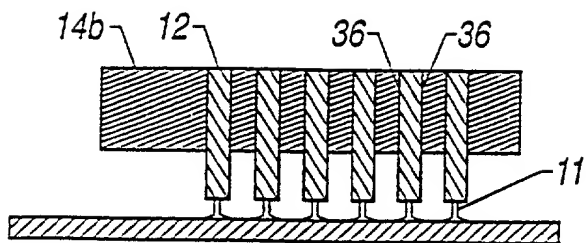


FIG. 7

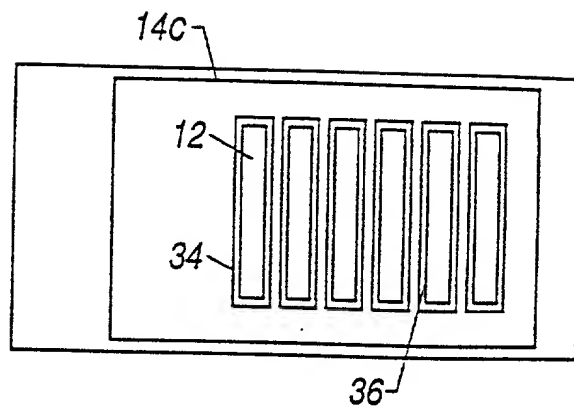


FIG. 8

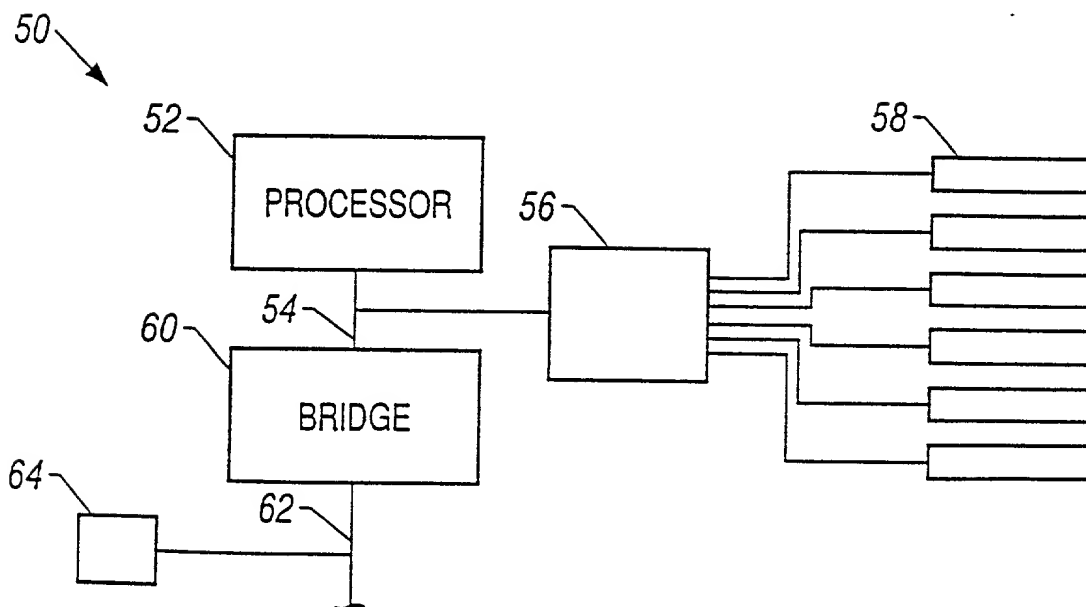


FIG. 9

## DECLARATION

SOLE/JOINT INVENTOR  
ORIGINAL/SUBSTITUTE/CIP

As a below named inventor, I hereby declare that: my residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

INTEGRATED CIRCUIT PACKAGE SUPPORT SYSTEM

as described in the specification [x] attached or [ ] of patent Application Serial No. \_\_\_\_\_, filed \_\_\_\_\_ and amended on \_\_\_\_\_.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above; that I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application; that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months prior to this application; and that I acknowledge the duty to disclose information of which I am aware which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations § 1.56(a). Such information is material when it is not cumulative to information already of record or being made of record in the application, and

(1) it establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) it refutes, or is inconsistent with, a position the applicant has taken or may take in:

(i) opposing an argument of unpatentability relied on by the Office, or

(ii) asserting an argument of patentability.

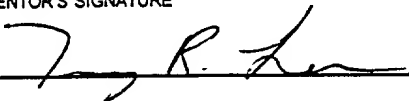
I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificates listed below and have also identified below any foreign application(s) having a filing date before that of the application(s) on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE OF FILING	PRIORITY CLAIMED UNDER 35 USC 119
			<input type="checkbox"/> YES <input type="checkbox"/> NO

I hereby claim the benefit under Title 35 United States Code § 120 of any United States application(s) listed below and, insofar as any subject matter of any claim of this application is not disclosed in the prior United States Application, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations § 1.56(a) which occurred between the filing date of the prior application and the national PCT international filing date of this application:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant/Patentee: §

David J. Corisis, §  
Walter J. Moden and §  
Terry R. Lee §

Filed: CONCURRENTLY HEREWITH §

Atty File: 07653/015001  
(97-553)

Serial No.: §

For: INTEGRATED CIRCUIT §  
PACKAGE SUPPORT SYSTEM §

## POWER OF ATTORNEY BY ASSIGNEE

Under the provisions of 37 C.F.R. § 3.71, the undersigned assignee of record of the entire interest in the above-identified patent/patent application by virtue of an assignment recorded (check as applicable):

☒ Concurrently Herewith  
☐ Date Recorded \_\_\_\_\_  
☐ Reel \_\_\_\_\_ Frame \_\_\_\_\_

elects to conduct the prosecution of the application/maintenance of the patent to the exclusion of the inventor(s). The undersigned hereby declares that he has reviewed the above-referenced assignment and hereby declares that, to the best of his knowledge, title is in the Assignee, and further declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true. The assignee hereby revokes any previous powers of attorney and appoints the following to prosecute this application/maintain this patent and transact all business in the Patent and Trademark Office connected therewith:

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The undersigned is authorized to sign this statement on behalf of the Assignee.

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Date: Mar 21, 1997

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